CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: September 22, 2021 FILE REF: 3400

TO: File

FROM: Woody Myers - WCR

SUBJECT: Ellsworth Wastewater Treatment Facility - Groundwater Evaluation Report, WPDES Permit # WI-0021253

Site Information

The Ellsworth Wastewater Treatment Facility (WWTF) is located on Utility Street, Ellsworth, Pierce County. This is a municipal facility. Wastewater is currently treated and discharged to Isabelle Creek located in the NE ¼ of the NE ¼ of Section 20, T26N, R17W, Town of Ellsworth.

Geology

The bedrock under this facility is the Sinnipee Group. This group includes the Galena, Decorah, and Platteville formations. The Sinnipee is comprised of dolomite with the exception of the Decorah Formation which is comprised of shale (*Bedrock Geology of Wisconsin, Regional Map Series West-Central Sheet*, Wisconsin Geological and Natural History Survey (WGNHS), 1988). Bedrock is anticipated to be no deeper than 10 feet below ground surface (bgs) (*Depth to Bedrock in Wisconsin,* WGNHS, 1973). Surface soil consists of the Ella and the Orion silt loams (USDA Web Soil Survey).

Hydrogeology

Region groundwater is to the south southeast in this area of Pierce County (Generalized Water-Table Elevation Map of Pierce County Wisconsin, University of Wisconsin Extension, 1990). The site is adjacent to Isabelle Creek. There are two wells used for drinking water within a 1,500-foot radius.

Land Treatment Loading Rates

There are two active outfalls at this facility.

Sampling Point (Outfall) Listed in SWAMP		
Number	Outfall Type	Description
Outfall 001	Surface Water	Effluent
Outfall 002	Municipal Sludge	Liquid Sludge

The following table is the average flow (hydraulic loading) and total nitrogen and chloride loading summations for the Land Treatment System.

Averages			
Year	Flow (MGD)	Nitrogen (mg/l)	Chloride (mg/l)
2021*	0.270	3.6	302
2020	0.348	3.8	310
2019	0.367	4.1	322
2018	0.302	5.2	298
2017	0.334	5.7	300
2016	0.328	4.2	353

* Indicates partial year

Conclusions

A groundwater evaluation was performed for this facility due to the geologic environment of the discharge location. Isabelle Creek flows over karst bedrock that is known to develop dissolution sink holes. These potential sink holes, if in the creek path, create a direct conduit to the groundwater aquifer. If this were to occur, the effluent from the WWTF has a high potential for degrading the groundwater quality.

Given potential of sink holes and the effluent averages over the past five years, the level of nitrogen could cause a ch. NR140.10 Table 1 Wis. Adm. Code preventive action limit exceedance in groundwater and the chloride could cause a ch. NR140.12 Table 2 Wis. Adm. Code Enforcement Standard exceedance. However, because the occurrence of a sink hole is a potential and not a given no effluent limits are being suggested based on protection of groundwater.

Compliance Schedule Recommendations

It is recommended that the WWTF inspect the creek bed for 1,000 feet from the discharge location downstream. The facility should look for sink holes and/or loss of stream flow. Any observed or suspected sink holes should be reported to the department. The WWTF will be required to evaluate repairs to the creek bed to prevent effluent from impacting groundwater.